Actuarial Association of Europe

2nd European Congress of Actuaries – Brussels 2016

Big Data & Insurance Analytics versus Data Protection

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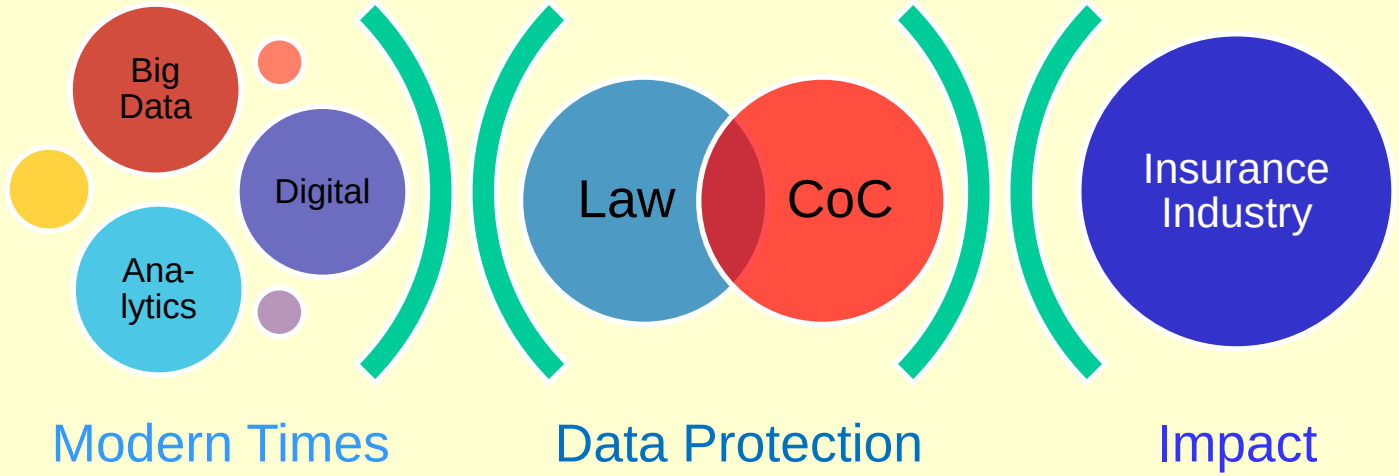
Agenda

- **Modern times – challenges & opportunities**
- **Data Protection**
- **Impact on insurance industry**



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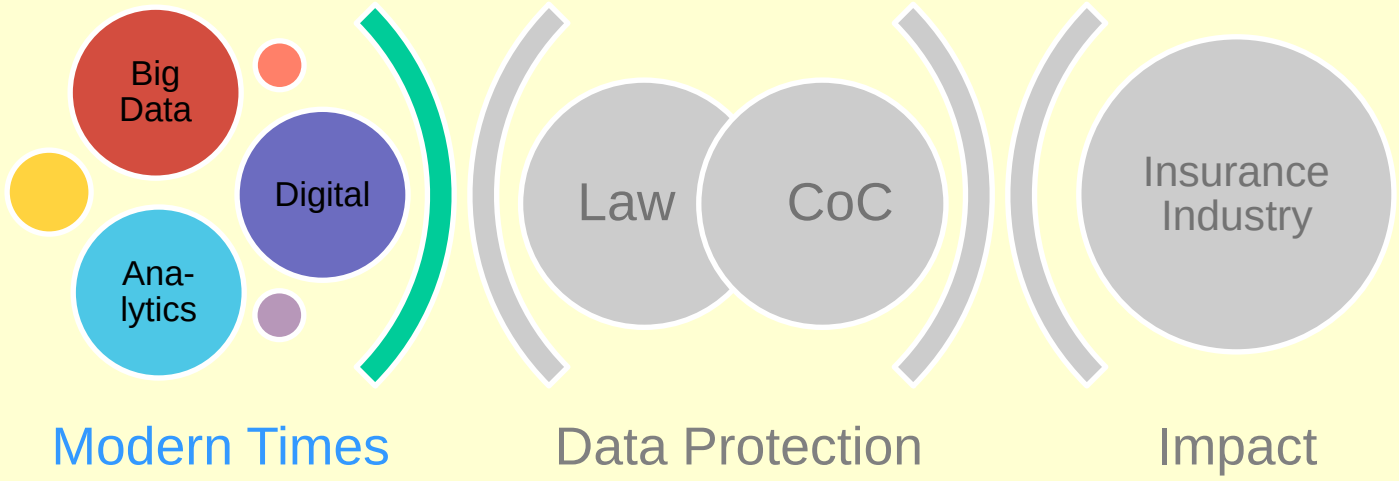

Variety of terms

BIG DATA

Digitalisation

Data Mining

KDD*

Innovative Products

telematics

CRISP-DM**

24/7

no SQL

pay as you drive

cloud

pay as you live

smart

Insurance Analytics

in memory

*) Knowledge Discovery in Databases
**) Cross Industry Standard Process for Data Mining

References: ini20: http://ini20.de/tag/big-data & http://pixabay.com

Variety of terms – attempt for classification

buzzword
BIG DATA

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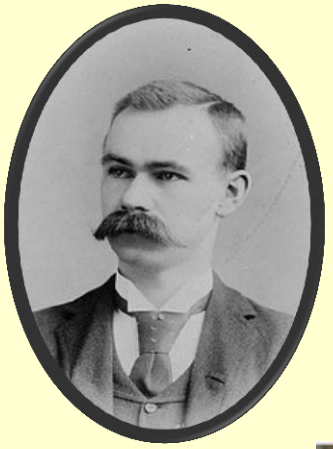
BIG DATA

- Wikipedia: **"Big data** is a broad term for data sets so large or complex that traditional data processing applications are inadequate. […]
- The term often refers simply to the use of **predictive analytics** or certain other advanced methods to extract value from data and seldom to a particular size of data set."

Maybe one of the first examples of Big Data in history:



- **United States Census 1880**: time required to process the census: 7 years (!)
- Herman Hollerith (1860 – 1929) developed an electromechanical punched card tabulator to assist in summarising information and, later, accounting.
- **United States Census 1890**: time required to process the census: only about 3 years (!)
- He was the founder of the *Tabulating Machine Company*, later (together with three other corporations) renamed

References : https://en.wikipedia.org/wiki/Big_data &
https://de.wikipedia.org/wiki/Herman_Hollerith

Data Mining

Data Mining =

- *(in the strict sense):* Extraction of knowledge from data
- *(in a broader sense):* Analysis of large data sets (Big Data!)
  - (often) based on statistical methods
  - with the objective of gaining new knowledge (correlations, trends, patterns) from data

Insurance Analytics =

- Data Mining with insurance-specific issues
- analysis of large data sets for different purposes
  - customer behaviour
  - predictive marketing
  - elastic pricing
  - …

Reference : http://pixabay.com

Innovative Products

Big Data enables innovative products:

- individualisation respect to „*time*“:
  - „spontaneous“ closing of an insurance contract via Smartphone-App (pay per use)
  - insurance for a short period
    - e.g. accident insurance for carnival

- progressive individualisation:
  - ***pay as you drive / telematic***
  - ***pay as you live***

Data Protection!
(more on that later)

Big Data requires innovative products:

- insurance for self-propelled cars

References: https://appsichern.de/shop/sport-events/jeckenschutz-cgn-16.html &
http://www.google.com/selfdrivingcar/images/home-where.jpg

First interim conclusion

- „Modern times“ with challenges & opportunities
  - **Digitalisation**
  - **Insurance Analytics**
  - **Innovative Products**

- Implications for insurance companies: All core processes!
  - organisation structure
  - distribution
  - business processes
  - policy administration system
  - claims management
  - software / system architecture
  - risk management
  - ➔ **working environment of actuaries!**

References: https://nubi.com/films/modern-time
& DAA-Ausbildungsseminar „Informationsverarbeitung für Aktuare“, 2015, Kap. Kernprozesse eines Versicherungsunternehmens, Folie 12

Agenda

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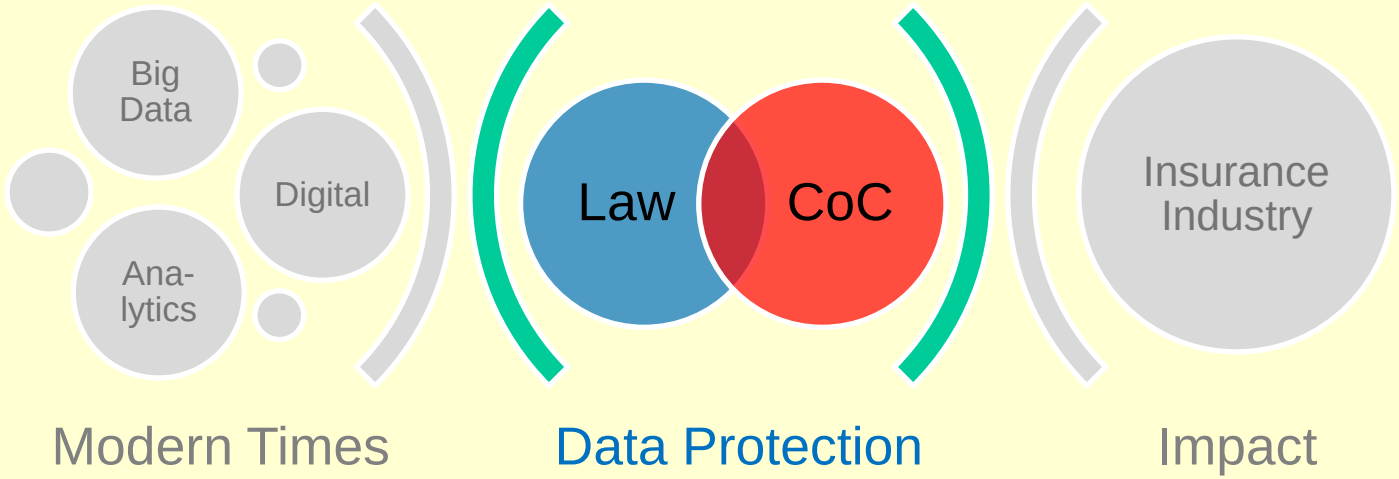
- Impact on insurance industry



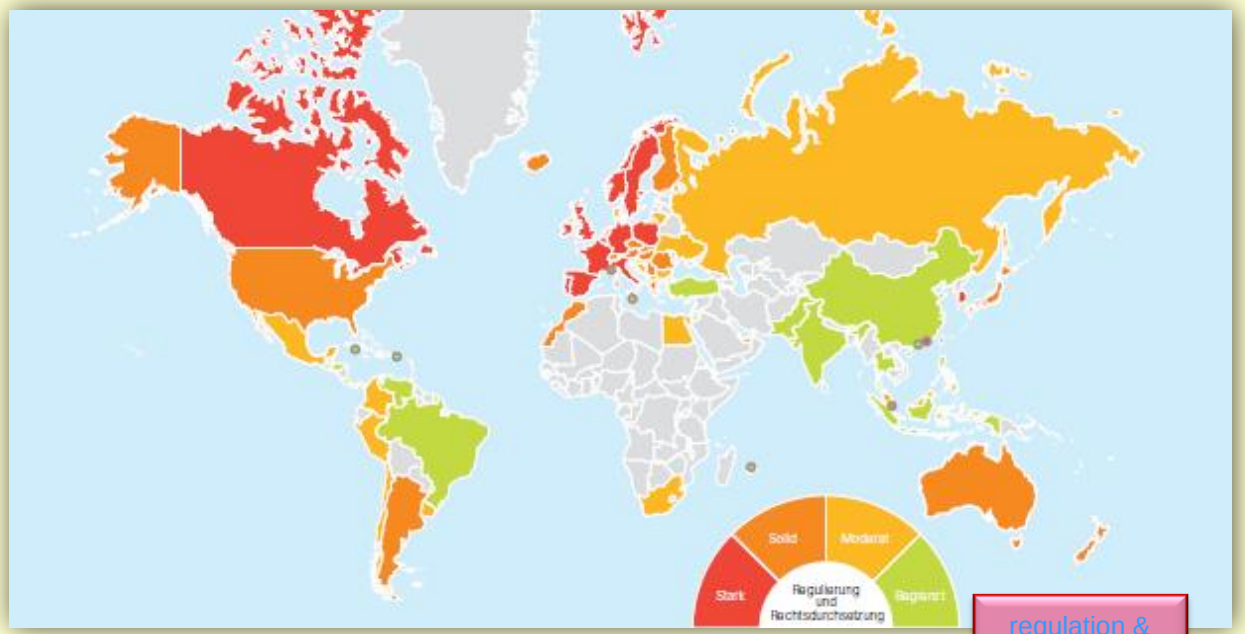
Data Protection

Data Protection =

- protection against abusive data processing
- protection of the right to informational self-determination

➔ due to technological progress in connection with Digitalisation the concept of Data Protection gaining importance …

➔ … but not everywhere in the world



regulation & enforcement

References: European Parlament, LIBE Commitee;
http://www.europarl.europa.eu/committees/de/libe/subject-files.html?id=20120514CDT45071#
& DLA Piper, Data Protection Laws of the world Handbook, DLA Piper 2015

Data Protection in Germany (1)

- The *Hessian Data Protection Act*, the Data Protection Act for the government of the Land Hessen.
- It entered into force in 1970 and is the first and oldest formal privacy law in the world!*
- Already here we find the central concepts of Data Protection:
  - ❖ **Right to informational self-determination**

  = the right of individuals, to decide on the release and use of their personal data
  - ❖ **personal data**

  = data describing the personal or factual circumstances of a natural person

  = data that can be assigned to a specific person (!)

  (also, if the name is **not** part of the data)

*) Alexander Genz: Datenschutz in Europa und den USA. Deutscher Universitäts-Verlag, Wiesbaden 2004. ISBN 3-8244-2185-2, S. 9.
Reference: https://de.wikipedia.org/wiki/Hessen

Data Protection in European Union (EU)

DIRECTIVE 95/46/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 24 October 1995
on the protection of individuals with regard to the processing of personal data and on the free movement of such data

- defines a minimum standard for data protection
- generally prohibits **(!)** the processing of sensitive personal data
- defines exceptions:
  - explicit approval of the concerned person or
  - important reasons
- obligation to transpose into national law

DIRECTIVE 2002/58/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 12 July 2002
concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)

- Supplement for electronic communications in Directive 2002/58/EC

Reference: http://eur-lex.europa.eu/homepage.html

Data Protection in Germany (2)

- Implementation in Germany: **Federal Data Protection Act** (Bundesdatenschutzgesetz)

Federal Data Protection Act

Federal Data Protection Act in the version promulgated on 14 January 2003 (Federal Law Gazette I p. 66), as most recently amended by Article 1 of the Act of 14 August 2009 (Federal Law Gazette I p. 2814)
This Act serves to implement directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data (OJ EC no. L 281, p. 31 ff.).

Part I
General and common provisions

Section 1
Purpose and scope
(1) The purpose of this Act is to protect the individual against his/her right to privacy being impaired through the handling of his/her personal data.

- ***„Prohibition Principles with reservation of authorisation“*** (Section 4), that means:
  - collection, processing, using of personal data is generally forbidden, except there is an
    - explicit approval of the concerned person or
    - legal basis
- ***„Data reduction and data economy“*** (Section 3a):
  - Personal data are to be collected, processed and used, and processing systems are to be designed in accordance with the aim of collecting, processing **and using as little personal data as possible.**

Code of Conduct Data Protection (CoC)

- released March 2013 of ***German Insurance Federation (GDV)***
- negotiated agreement for insurance business in Germany
- almost all German insurance companies are involved
- concretion of the regulations of **Federal Data Protection Act**
- **important principles (selection):**
  - section 2: collection, processing, using of personal data only in connection of establishment, implementation or termination of insurance contracts
  - section 6: special types of personal data (e.g. health data) only with separately explicit approval of the concerned person
  - section 7: collection of personal data only from the concerned person
  - section 18: marketing based on personal data only with explicit approval of the concerned person (also: section 28 **Federal Data Protection Act**)
  - section 23: right to information
  - section 24: right to correction, deletion and blocking of incorrect data or if the collection was illegal

Reference: Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV); *Verhaltensregeln für den Umgang mit personenbezogenen Daten durch die deutsche Versicherungswirtschaft*; 09/2012

General Data Protection Regulation

General Data Protection Regulation

- should replace the directive 95/46/EC and 2002/58/EC
- a Regulation setting out a general EU framework
- no need to transpose into national law
- on April 21 (today!), it is on the agenda for voting by the EU Council of Ministers
- then only the agreement of the European Parliament is needed
- after 2 years the regulation will be applied -> July 2018

The details of the regulation have to be analysed, but **my personal opinion**:

"The General Data Protection Regulation will **not** be weaker than the German Federal Data Protection Act."

Second interim conclusion

- „Modern times“ with challenges & opportunities
  - **Digitalisation**
  - **Insurance Analytics**
  - **Innovative Products**

- **versus Data Protection**
  - Directive 95/46/EC & Directive 2002/58/EC
  - Federal Data Protection Act
  - Code of Conduct Data Protection (CoC)
  - General Data Protection Regulation

➔ **Conflict between …**

- BIG DATA **versus** „Data reduction and data economy“
- Insurance Analytics **versus** Prohibition Principles
- Innovative products **versus** right to informational self-determination

References: https://nubi.com/films/modern-time & European Parlament, Liebe Commitee; http://www.europarl.europa.eu/committees/de/libe/subject-files.html?id=20120514CDT45071#

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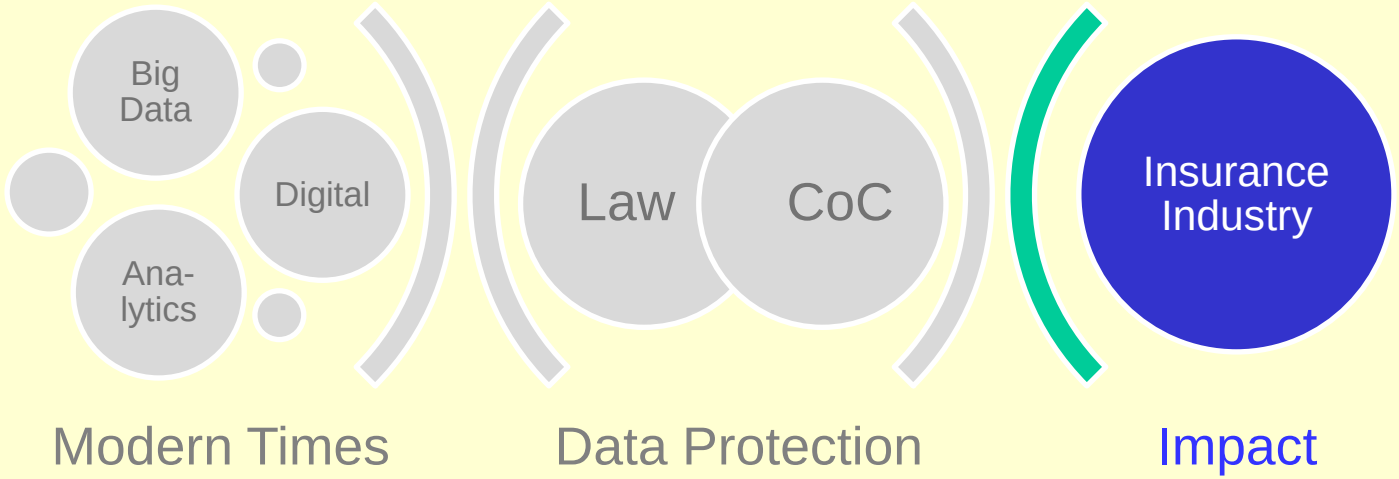
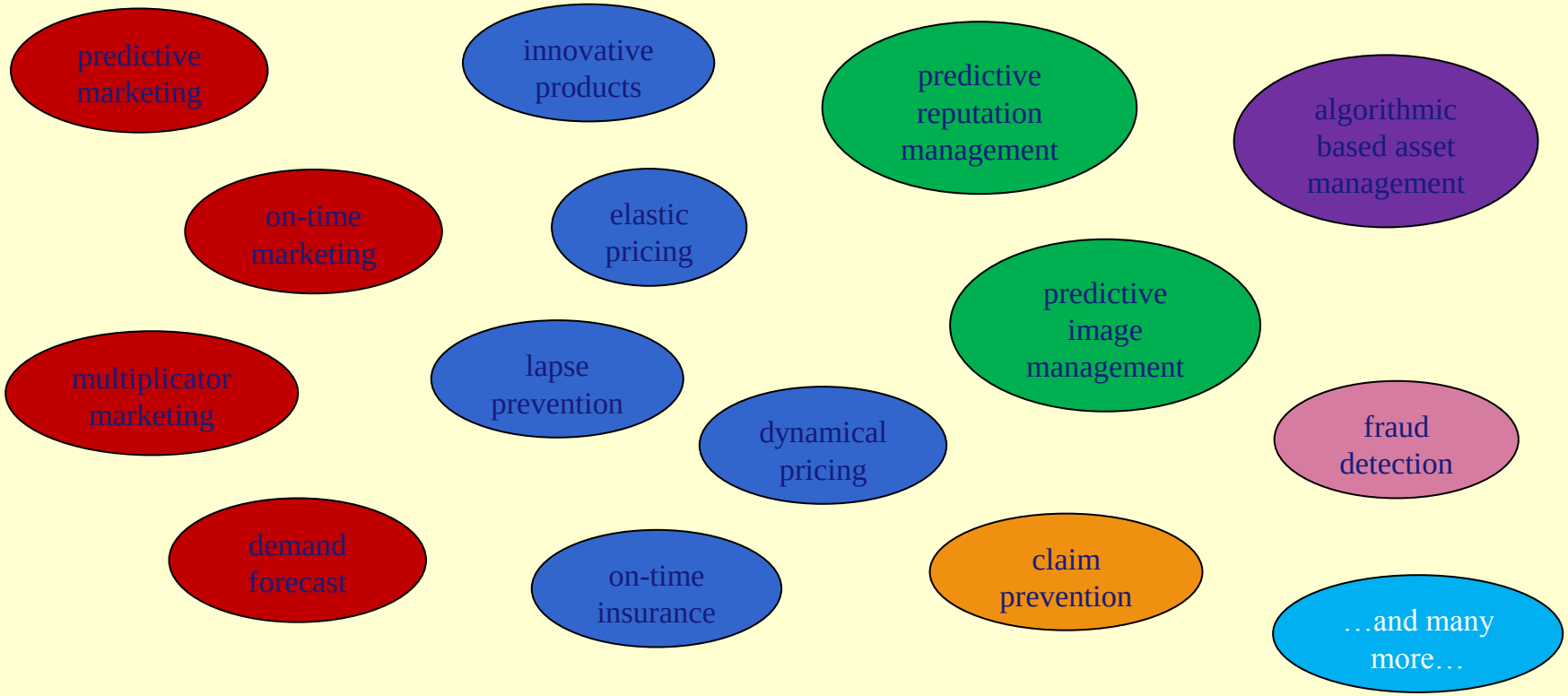


Impact on insurance industry

Business cases for insurance industry in context of Big Data & Insurance Analytics (selection):



Impact on insurance industry

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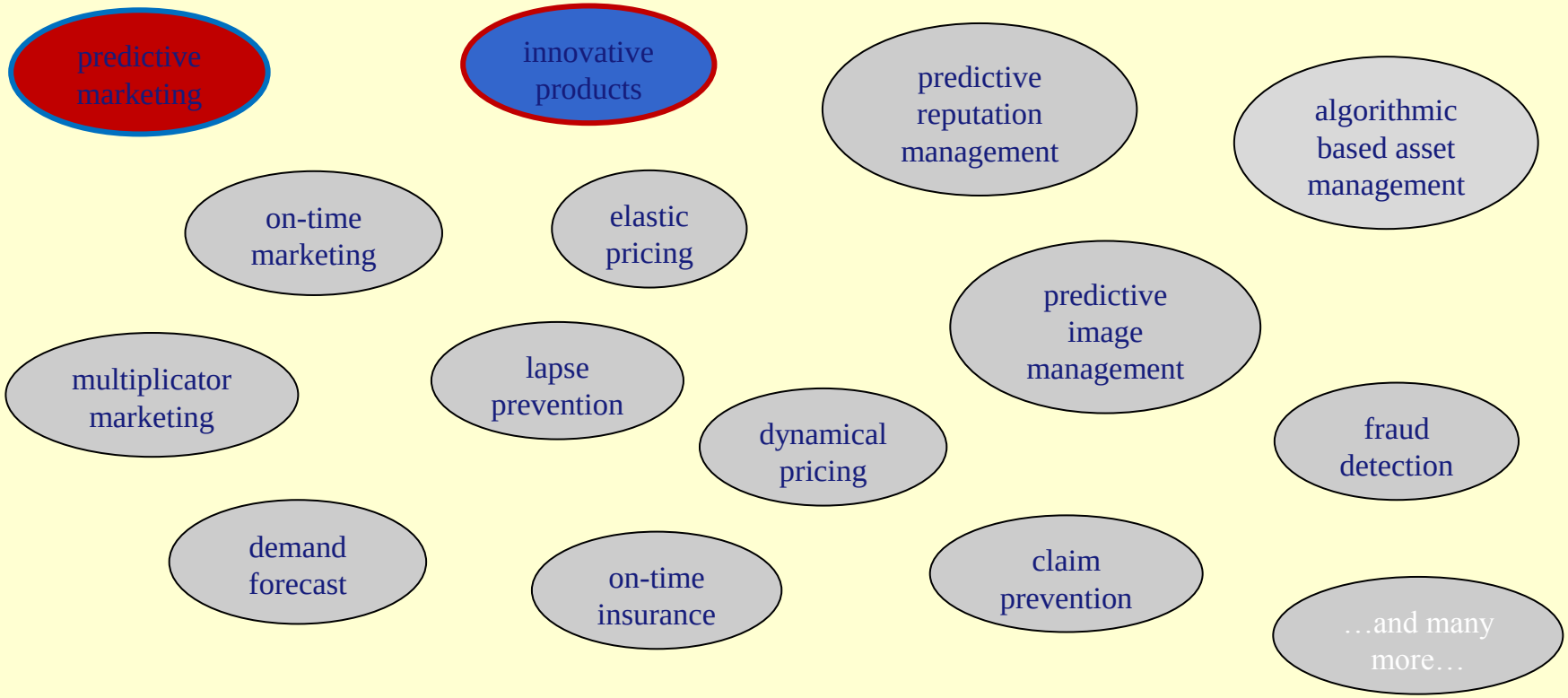


The conflict with Data Protection will be inspected for two business cases:

- ⌘ Insurance Analytics for predictive marketing
- ⌘ Innovative product *pay as you live*

Case example 1 – predictive marketing (1)

Predictive marketing =

- **“targeted sales approach based on expected buying patterns”**
- we all know it from amazon.de

- **method:** Insurance Analytics based on several data sources (selection):

1. customer information (existing contracts)
2. external public information
3. social media data
4. behaviour on the internet

- **target:** finding correlation to other clients & deductive reasoning to buying patterns

- benefit for insurance company:
  - cost saving (no inefficient advertising campaign)
  - increase in sales
  - customer satisfaction (no annoying advertising)

- benefit for (potential) client:
  - matching offers
  - no annoying advertising

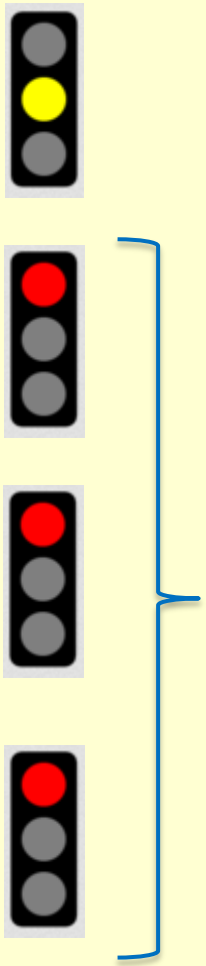
Case example 1 – predictive marketing (2)

(fictive) example

- **level 1** (only customer information): Mr N.: 50 years old, client for 10 years, risk insurance, sum insured = 50.000 €
  - ⌘ 67% of the 50 years old clients with risk insurance have additional disability insurance -> special offer?
- **level 2** (add. public information): Mr N. – actuary for 15 years, earning (probably:-) more than 100.000 € per year*
  - ⌘ 88% of comparable clients have a sum insured higher than 250.000 € -> special offer?

*) Reference: DAV income survey 2014

- **level 3** (add. social media data): Mr N. is father of 2 children, he likes parachute jumping
  - ⌘ 57% of comparable clients have additional compensation insurance -> special offer?
- **level 4** (add. behaviour on the internet): Mr N. favorite page: **Porsche**, obviously he is dreaming about a 911
  - ⌘ 27% of comparable clients have in addition a dread disease insurance -> special offer?



Data Protection

- only with explicit approval!
  - ➢ section 18 CoC
- **conflict with:**
  - ➢ section 2 CoC
    - ❖ only in connection with establishment, implementation or termination of insurance contracts
  - ➢ section 7 CoC
    - ❖ only from the concerned person
  - ➢ section 3a FDPA
    - ❖ Prohibition Principles with reservation of authorisation
  - ➢ section 4 FDPA
    - ❖ Data reduction and data economy

Reference: Wiktionary: https://de.wiktionary.org/wiki/Ampel &
Homepage Porsche: http://www.porsche.com/germany/

Case example 2 – pay as you live (1)

How will that look like in practice?

- smart-watch, wearable, apps …
  - **fitness wearables** (e.g. Fitbit, Nike+, Runtastic, …): collecting & transmitting fitness data (counting steps, range of motion, …)
  - **medical wearables** (e.g. AliveCor, iBG Star …): collecting & transmitting medical data (pulse, blood pressure, calories burned/supplied,…) into the cloud (in truth: to a central computer of the insurer)
  - additional behaviour data on the insured person (facebook-likes, buying behaviour, dealing with others, …)

Aktivitätsapp
Spüre das Erfolgserlebnis, wenn du die Ringe „Bewegen", „Trainieren" und „Stehen" schließt.

- based on these data: price surcharges and reductions are calculated
- in a stage of development: completely individualised tariffs are re-calculated continuously

Reference: Apple Homepage: http://www.apple.com/de/watch/

Case example 2 – pay as you live (2)

(fictive) example: risk insurance, benefit (only) in case of death

- **level 1** (only fitness data): fitness wearables
  - ⌘ special offer: 10% rebate, if targets are reached for x days (e.g. 100 days) last year
- **level 2** (add. medical data): medical wearable
  - ⌘ special offer: (add.) 20% rebate, if exceed limits only y times (e.g. 20 times) last year

(fictive) example: risk insurance, benefit (only) in case of death

- for a client with diabetes -> normally not insurable
- special medical wearable: regularly measures the blood sugar level
- e.g. iBGStar (sanofi-aventis)
  - ⌘ special offer: insurance limited in time (e.g. 1 year)
    - ➢ renewal (for 1 year),
    - ➢ (only) if blood sugar level was higher only for 10 times last year

Data Protection

- ➢ section 2 CoC
  - ✓ only in connection of establishment, implementation or termination of insurance contracts
- ➢ section 6 CoC
  - ✓ only with explicit approval!
- ➢ section 7 CoC
  - ✓ only from the concerned person
- ➢ other sections
  - ✓ …

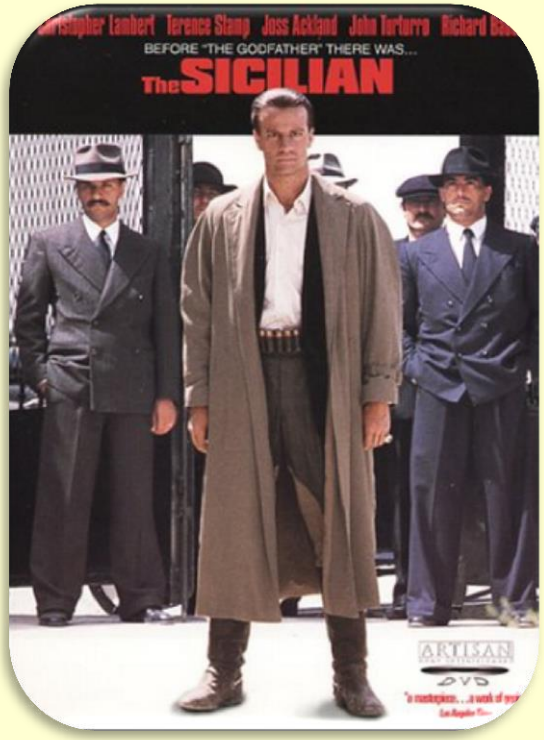
Reference: Wiktionary: https://de.wiktionary.org/wiki/Ampel & http://www.itunes.apple.com

Finally: (Not) only a joke

„What ist the difference between a German actuary and a Sicilian actuary?

The German actuary knows approximatley how many people in his insurance portfolio will die in the next year –

the Sicilian actuary even knows who will die!“



Thesis / Question: In the future we will all be Sicilian actuaries and we will know who will die in our insurance portfolio?

Reference : amazon, http://www.amazon.com/Sicilian-Christopher-Lambert/dp/B00005QAP2/ref=sr_1_2?ie=UTF8&qid=1450889161&sr=8-2&keywords=The+sicilian

References

BIG Thanks!

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